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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,201	12/15/2003	Donald L. Yates	M4065.0489/P489-A	4789
24998	7590	11/22/2005	EXAMINER	
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP			TSAL, H JEY	
2101 L Street, NW			ART UNIT	
Washington, DC 20037			PAPER NUMBER	
			2812	

DATE MAILED: 11/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/734,201	Applicant(s) YATES ET AL.	
	Examiner H.Jey Tsai	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22-33, 40 and 41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 22-33, 40-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 22-33 and 40-41 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. "Barrier disposed over the insulating layer" is not described in the specification. The instant invention merely describes the barrier layer 59 formed in the trench of an insulating layer 54.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 22-33, 40-41 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Ning 6,709,874.

Ning teaches a magnetic random access memory structure comprising:
an insulating layer 210/110/112/212, fig. 1-4,
a planarized barrier layer 116 disposed over the insulating layer 210/110/112/212,
a plurality of longitudinally extending planarized conductive lines 118/218 formed over an insulating layer 210/110/112/212 of a semiconductor substrate 100, col. 4, lines 40-67, col. 5, lines 18-26, col. 6, lines 67 and figs. 1-4,
respective first magnetic layers (NiFe of bottom metal stack of stack layer 222) over the conductive lines 118/218, note: magnetic stack layer 222 includes PtMn/CoFe/Tu/NiFe/dielectric Al_2O_3 /a plurality of magnetic layer, col. 6, lines 49-67,
respective second magnetic layers (top metal stack of stack layer 222) over the first magnetic layer NiFe, col. 7, lines 4-13,
a nonmagnetic layer Al_2O_3 between the first and second ferromagnetic layers (NiFe and plurality of magnetic layer of stack layer 222), col. 7, lines 103,
a planarized conductive material layer 120/220 formed between the first planarized conductive lines 118/218 and barrier layer 116 and the first magnetic layers NiFe of stack layer 222, col. 5, lines 33-67 and col. lines 41-67,
the conductive material layer 120/220 is selected from the group consisting of tantalum (Ta), titanium (Ti), titanium-tungsten (TiW), and titanium nitride (TiN), col. 5, lines 39-45 and the material layer is a resistive material (heavy refractory metal),
the insulating layer is SiO_2 .

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the conductive material layer is formed to a thickness of about 10 nm to about 150 nm,

the conductive lines are formed in a trench formed in the substrate 110/210, at least one magnetic random access memory (MRAM) cell 222, col. 2, lines 33-67 and figs. 4.

Claims 22, 25, 27-28, 31, 33 and 40-41 are rejected under 35 U.S.C. § 102(e) as being anticipated by Jones 6,555,858.

Jones teaches a magnetic random access memory structure comprising:
an insulating layer 218/224, fig. 4,
a planarized barrier layer (Ta or TaN etc) disposed over the insulating layer 218/224, col. 4, lines 52-58,
a plurality of longitudinally extending planarized conductive lines 228/229a/229b (a digit line) formed over an insulating layer 218/224 of a semiconductor substrate 200, col. 5, lines 5-30 and figs. 4-6,
respective first magnetic layers 234 (a multilayer stacks) over the conductive lines 232, col. 5, lines 31-67,
an dielectric layer 236 of Al_2O_3 , col. 5, lines 30-67,
respective second magnetic layers 238 or one more layer of multilayer stacks of layer 234 over the first magnetic layers 234, col. 5, lines 31-67,
a planarized conductive material layer 232 formed between the planarized conductive lines 228/229a/229b, barrier layer (Ta or TaN etc) and said first magnetic layers 234, col. 5, lines 18-67,
the insulating layer is SiO_2 .

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the conductive material layer is formed to a thickness of about 40-60 nm,
the conductive lines are formed in a trench formed in the substrate, fig. 4,
at least one magnetic random access memory (MRAM) cell 234, 236, 238, col. 5,
lines 30-67 and figs. 6.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 22-33 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 43-67 of copending Application No. 10/196,933. Although the conflicting claims are not identical, they are not patentably distinct from each other because an insulating layer formed between first and second magnetic layers for a MRAM device is obvious. The insulating layer serves as a tunneling layer for MRAM device. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 23-24, 26, 29-30 and 32 stand rejected under 35 U.S.C 103 as being unpatentable over Jones et al. as applied to claims 22, 25, 27-28, 31 and 33 above, and further in view of Ning 6,709,874.

The difference between the references applied above and the instant claim(s) is: Jones teaches a planarized conductive material formed between first magnetic layer and planarized conductive lines but does not teach the specific range of thickness and the resistive material. However, Nine teaches at col. 5, lines 39-45 the conductive material layer 120/220 is selected from the group consisting of tantalum (Ta), titanium (Ti), titanium-tungsten (TiW), and titanium nitride (TiN), and the material layer is a resistive material (heavy refractory metal), the conductive material layer is formed to a thickness of about 10 nm to about 150 nm.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings by using a high resistive refractory material and a specific thickness as taught by Ning et al. because resistive

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material and specific thickness will limit the current flow to form a low current MRAM cell.

Applicant's arguments filed Sept. 16, 2005 have been fully considered but they are not persuasive. Because Ning clearly teaches at fig. 4, cap metal layer formed over the barrier layer 116 and there is not seen in claimed invention that conductive material layer formed over the barrier layer. And, Ning clearly teaches in figs. 1-4, a planarized barrier layer 116 formed over insulating layer 210/110/112, a planarized conductor 118/218 formed over the insulating layer 110/210/112/212, a planarized conductive lines 118/218 formed over an insulating layer 210/110/112/212 of a semiconductor substrate 100, a planarized conductive material layer 120/220 formed between the first planarized conductive lines 118/218 and barrier layer 116 and the first magnetic layers NeFi of stack layer 222. Jones et al. also clearly teaches at fig. 4-6, col. 5, lines 18-67, a planarized conductive material layer 232 formed between the planarized conductive lines 228/229a/229b, barrier layer (Ta or TaN etc) and the first magnetic layers 234 and first magnetic layer 234 formed over the planarized conductor 228/229a/229b.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry of a general nature or clerical matters or relating to the status of this application or proceeding should be directed to the customer service whose telephone number is (703) 308-4357.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. Jey Tsai whose telephone number is (571) 272-1684. The examiner can normally be reached on from 7:00 Am to 4:00 Pm., Monday thru Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873.

The fax phone number for this Group is (703) 872-9306.

hjt

11/15/2005



H. Jey Tsai
Primary Examiner
Patent Examining Group 2800